

**Plant Diseases You Should Know**

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## Disease Management

- Disease identification
- Disease resistance
- Disease free plants
- Right plant, right place
- Irrigate to prevent stress
- Pruning – remove diseased branches
- Sanitation – remove diseased plants
- Fungicides

## Descriptive Names for Plant Diseases are based on:

- Fungal – mildews, rusts, gray mold
- Plant parts – leaf spots, stem rots, root rots
- Symptoms – leaf and flower galls, crown gall, root knot
- By pathogen – bacterial, viral, nematode

## Powdery mildew

- Hosts
- Amelanchier, apple, azalea, begonia, columbine, crabapple, crape myrtle, dogwood, euonymus, hydrangea, lilac, magnolia, nandina, oak, phlox, rhododendron, rose, sedum, tuliptree, verbena, zinnia
- White powdery fungal growth on leaves

## Powdery Mildew



## Downy Mildew

- Hosts
- Alyssum, brambles, coleus, grape, garden impatiens, pansy, rose, rudbeckia, salvia, snapdragon, tobacco, viburnum
- Look for angular lesions, white to gray fungal growth on underside of leaves

## Downy Mildew



Coleus 'Wasabi'

## Downy Mildew



Basil



Garden impatiens

## Impatiens downy mildew



Note the pink, Bounce impatiens is not affected by downy mildew.

## Botrytis Blight

- Cool, wet weather favors
- Lots of spores
- Sanitation is important
- Many hosts herbaceous and woody

## Botrytis Blight



## Botrytis Blight (gray mold)



Rose

## Rusts

- Hosts
- Amelanchier, apple, aster, azalea, cedar, crabapple, daylily, fuchsia, geranium, grasses, hawthorn, hemlock, hollyhock, iris, jack-in-the-pulpit, juniper, mayapple, oak, pear, pine, potentilla, quince, snapdragon, sunflower
- Look for yellow-orange to rusty brown spore masses/pustules on stems, twigs, leaves, fruit

## Rusts



## Cedar Rusts



## Cedar-Quince Rust



## Plant Viruses Diseases

- Hosts
- **Canna yellow mottle virus** – Tropicana series of canna lily
- **Hosta Virus X**- many common cultivars of hosta
- **Impatiens necrotic spot virus**- over 350 ornamental plants
- **Rose mosaic virus and Rose rosette**- rose
- **Tomato Spotted Wilt Virus** -tomato

## How do Viruses spread Plant to Plant?

- Insects (cucumber mosaic virus –aphids; tomato spotted wilt virus, impatiens necrotic spot virus-thrips)
- Nematodes (tobacco rattle virus)
- Mites (rose rosette virus)
- Sap (tobacco mosaic virus)
- Fungi (soil-borne mosaic)

## Symptoms of Virus diseases

- Variety of symptoms including: mosaic, ringspots, oakleaf patterns, stunting, flower break



Flower break and ringspot symptoms on mountain laurel.

## Hosta virus X



On chartreuse hosta, dark green bands along veins indicate HVX.

## Viral Symptoms

Several plant virus cause ringspots symptoms on leaves and/or fruit. Two of the most common are: tomato spotted wilt virus and impatiens necrotic spot virus.



Line pattern or oak leaf pattern



Ringspots

## Rose rosette

Rose rosette virus causes a witches broom (rosette) symptom: infected plants die within 2-3 years. Many roses are susceptible. Eriophya mites are vectors of the virus.



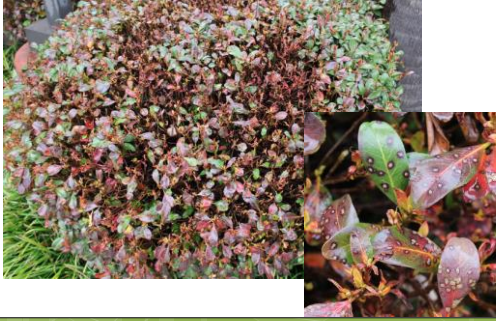
## Leaf Spot Diseases

- **Alternaria LS** - aucuba, impatiens, marigold, zinnia
- **Bull's eye LS** - magnolia, maple
- **Cercospora LS** - buckeye, crape myrtle, leucothoe, laurel, red bud, rose
- **Entomosporium LS** - Indian hawthorn, pear, photinia
- **Phyllosticta LS** - holly, magnolia, maple, witch hazel

## Gray leaf spot - tomato



### Entomosporium leaf spot



### Leaf spot diseases



Black Spot - rose

### Boxwood Blight



Looks for circular leaf spots and stem lesions.

### Shot hole disease



Laurel

Shot hole disease of cherry



### Anthracnose Diseases

- Hosts
- Ash, dogwood, euonymus, hosta, maple, oak, sycamore
- Anthracnose diseases may cause leaf blight, twig/shoot dieback, leaf and flower spots, and cankers

### Sycamore Anthracnose



### Spot Anthracnose



Flowering dogwood

### Needle Casts/Tip Blights

- Hosts
- *Cyclaneusma needle cast* - scots pine
- *Lophodermium needle cast* - Eastern white pine
- *Ploioderma needle cast* - loblolly pine
- *Rhizosphaera needle cast, Stigmia needle cast* - spruce
- *Phomopsis blight* - juniper
- *Kabatina blight* - juniper, Leyland

### Tip Blight



Usually no more than six inches of new or existing growth is killed.

### Needle Cast



Susceptible conifers will shed (cast) infected needles; new growth is not infected initially

### Canker Diseases

- Hosts
- *Botryosphaeria canker* - ash, crabapple, dogwood, juniper, laurel, Leyland cypress, red bud, maple, rhododendron
- *Endothia canker* - pin oak
- *Fire blight* - apple, cotoneaster, crabapple, hawthorn, pear, pyracantha, serviceberry
- *Nectria canker* - dogwood, pear
- *Phomopsis canker* - azalea, ash
- *Seiridium canker* - Leyland cypress, Arizona cypress
- *Thyronectria canker* - honey locust

## Fungal canker disease

A canker disease is a localized infection of a stem or branch.



Fusicoccum canker of ash

## Fire Blight



## Fungal Canker disease

- Localized infection, often causing branch dieback
- May follow drought stress
- Prune out dead branches to stop spread



## 1 year Later- Canker has moved to main Stem

- To prevent: irrigate to minimize water stress
- Prune out dead branches when they are observed or you could lose the whole plant



## Leaf Galls

### Hosts

**Leaf gall** - Azalea, blueberry, camellia,, rhododendron

**Leaf blister** - red oak, water oak, willow oak

**Leaf curl**- peach, plum

## Peach leaf curl



## Camellia leaf gall



## Azalea leaf and flower gall



## Crown Gall

- Hosts
- Apple, cherry, crabapple, Euonymus, holly, maple, peach, plum, rhododendron, rose, willow, wisteria
- Tan to brown tumor like growths on roots, stems or branches; a bacterial disease

## Crown Gall



## Stem/crown rots

- Hosts
- **Southern Blight** - Ajuga, apple, clematis, crabapple, forsythia, hosta, many annual and perennial flowers, rarely on some turf species
- **Sclerotinia Stem Rot** - Campanula, euonymus, several herbaceous flowers
- **Rhizoctonia stem rot** - many herbaceous plants and seedlings of woody plants and conifers

## Southern Blight





## Southern blight/hydrangea



## Nematodes

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- **Hosts**
- **Root knot nematode** - Abelia, aucuba, boxwood, dogwood, gardenia, holly, hydrangea, impatiens, ligustrum, nandina, photinia, rose
- **Foliar nematode** - African violet, anemone, begonia, brunnera, hosta, many shade loving perennials
- **Lesion nematode** - boxwood, juniper

## Foliar Nematodes



## Root knot Nema damage/Tomato



## Root knot nemas hatching from egg mass



## Tomato disease Resistance Codes

- **V** Verticillium Wilt
- F** Fusarium Wilt
- FF** Fusarium, races 1 and 2
- FFF** Fusarium, races 1, 2, and 3
- N** Root Knot Nematode
- A** Alternaria
- T** Tobacco Mosaic Virus
- St** Stemphylium (Gray Leaf Spot)
- TSWV** Tomato Spotted Wilt Virus

## Resistant to Verticillium wilt, Fusarium wilt, root knot nematodes



## Wilt Diseases

- Hosts
- **Bacterial leaf scorch** - elm, red maple, mulberry, sycamore, pin oak, shingle oak
- **Dutch elm disease** - elm
- **Verticillium wilt** - ash, barberry, boxwood, buckeye, catalpa, daphne, elm, lilac, euonymus, smoke tree, maple
- **Fusarium wilt** - mum, more common on herbaceous plants

## Bacterial Leaf Scorch- Sycamore



## Bacterial streaming from a tomato stem



Image courtesy: J. Olive

## Dutch Elm Disease

Dutch elm disease was introduced on elm logs imported from Europe for furniture veneer in the 1920's. Elm bark beetles are the vector for the fungus that causes Dutch Elm Disease.



## Dutch elm disease



## Disease Resistant Elms

Disease resistance is a key management strategy when combating plant diseases.

- Princeton
- Valley Forge
- New Harmony



## Root Rot Diseases

### ○ Hosts

- **Black root rot** - Japanese holly, blue holly, inkberry, vinca, pansy, petunia
- **Phytophthora root rot** - azalea, dogwood, forsythia, fir, holly, juniper pieris, rhododendron, yew

## Root rot diseases

- Affected plants may be stunted, wilted
- Discolored, decayed roots
- Poor drainage, standing water, excessive irrigation, favor disease development



Phytophthora root rot/juniper

## Black Root Rot – Foliar Symptoms



## Root symptoms of black root rot

Dark, discolored roots on Japanese and blue holly, and inkberry are almost always a symptom of black root rot. Herbaceous hosts include: pansy, vinca, petunia



## Abiotic Problems

- Hosts
- **Nutritional/pH** - azalea, rhododendron, cleyera, pin oak, many others
- **Freeze injury** (bark splitting, shoot dieback, cambium death) - arborvitae, azalea, holly, Japanese maple, juniper, many young trees
- **Leaf scorch** - dogwood, Japanese maple
- **Herbicide injury** - many plants
- **Tissue proliferation** - rhododendron

## Herbicide Injury to dogwood



## Cold Injury –bark splitting



## Questions?



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